Claims

1. Method for operating a mill train for metal strip (1), having at least one roll stand (3), with a visible flatness (vp) of the metal strip (1) being taken into account at the discharge point of the mill train,
characterized in that the visible flatness (vp) and an intrinsic flatness (ip) of the metal strip (1) are taken into account using a bulge model (12) during control of the roll stands.

2. Method according to claim 1,
characterized in that the visible flatness (vp) is determined in the form of a bulge pattern.

3. Method according to claim 2,
characterized in that the bulge pattern is three-dimensional.

4. Method according to claim 2 or 3,
characterized in that in addition to the relative length of individual tracks (S1 to Sn) of the metal strip (1) at least one of the variables wavelength, amplitude and phase offset of the individual tracks (S1 to Sn) is evaluated to determine the bulge pattern.

5. Method according to one of the preceding claims,
characterized in that a multi-track laser measuring device (13) is used to determine the intrinsic flatness (ip).

6. Method according to one of claims 1 to 4,
characterized in that the visible flatness (VP) is measured

topometrically.

7. Method according to one of the preceding claims, characterized in that values for the visible flatness (vp) are translated into values for the intrinsic flatness (ip) using the bulge model (12).

8. Method according to one of the preceding claims, characterized in that values for the intrinsic flatness (ip) are translated into values for the visible flatness (vp) using the bulge model (12).

9. Method according to claim 7 or 8, characterized in that the flatness values (ip or vp) are translated online.

10. Method according to one of claims 7 to 9, characterized in that the flatness values (ip or vp) are translated with the aid of an online-capable approximation function.

11. Method according to one of the preceding claims, characterized in that the bulge pattern of the metal strip (1) is determined using the bulge model (12) by applying a fictitious temperature distribution in the transverse direction (y) of the metal strip (1), based on its intrinsic flatness (ip).

12. Method according to one of the preceding claims, characterized in that an intrinsic flatness (ip) is determined before a physical point for measuring flatness using a material

flow model (9).

13. Method according to one of the preceding claims, characterized in that one or more flatness limit values is/are predefined at freely selectable points to control the mill train.

14. Control device (2) for operating a mill train for metal strip (1) with at least one roll stand (3), in particular according to a method according to one of the preceding claims, with the control device (2) having at least one regulating unit (11),
characterized in that the regulating unit (11) is coupled to a bulge model (12).

15. Control device (2) according to claim 14,
characterized in that the bulge model (12) is coupled to a device for measuring the visible flatness (vp) of the metal strip (1).

16. Control device (2) according to claim 14 or 15,
characterized in that the control device (2) has at least one material flow model (9).

17. Control device (2) according to one of claims 14 to 16,
characterized in that the device for measuring the visible flatness (vp) is a multi-track laser measuring device (13).

18. Control device (2) according to one of claims 14 to 17,
characterized in that the bulge model (12) is coupled to at least one topometric measuring system to determine a bulge

pattern of the metal strip (1).